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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/730,713 | 11/26/2003 | Chen-Kuo Sun | 79777 | 4010 |

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| EXAMINER |
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WILLIAMS, DON J

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| ART UNIT | PAPER NUMBER |
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2878

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 01/29/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/730,713

Applicant(s)

SUN ET AL.

Examiner

Don Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3 and 5-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-12 and 15-20 is/are rejected.
- 7) ☒ Claim(s) 13,14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

Applicant's arguments with respect to claims 1, 3, 5, and, 6-20 have been considered but are moot in view of the new ground(s) of rejection.

In view of the Appeal Brief filed on 17 October 2006, PROSECUTION IS HEREBY REOPENED. Rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 15-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Sun et al (5,239,181).

As to claim 15, Sun et al disclose the steps of (a) receiving an analog input signal (Vi) and an optical input clocking signal (from fibers 22- 25), (b) determining whether an optical pulse is received by two photodetectors (S1-S4) from optical input clocking signal (from optical fibers 22-25), (c) maintaining a diode bridge (30) in forward bias and returning to STEP (a) if optical pulse is not received from optical input clocking signal (from fibers 22-25), (d) switching diode bridge (30) to reverse for a desired time and returning to STEP (a) if optical pulse is received from optical input clocking signal (from fibers 22-25), (fig. 2, column 4, lines 6-15, column 5, lines 15-33).

As to claim 16, Sun et al disclose (i) generating photocurrent sufficient to reverse bias diode bridge (30) if optical pulse is received from optical input clocking signal (from optical fibers 22-25), (ii) maintaining sufficient photocurrent to reverse bias diode bridge (30) for desired time, (iii) switching diode bridge (30) to forward bias when photocurrent becomes insufficient to reverse bias diode bridge (30), and (iv) returning to STEP (a) of claim 15, (fig. 2, column 4, lines 6-15, column 5, lines 15-33).

As to claim 17, Sun et al disclose maintaining diode bridge (30) in forward bias step comprising forward biasing diode bridge (30) by two photodetectors (S1-S4) not generating enough photocurrent, (fig. 2, column 4, lines 6-15).

As to claim 18, Sun et al disclose switching diode bridge (30) to reverse bias for a desired time step comprises reverse biasing diode bridge (30) by two photodetectors

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(S1-S4) quickly switching to an on-state, (fig. 2, column 4, lines 6-15, column 5, lines 15-33).

As to claim 19, Sun et al disclose switching diode bridge (30) to reverse bias for a desired time step uses a long transit time photodiode (S1-S4) to maintain sufficient photocurrent for desired time, (fig. 2, column 4, lines 6-15, lines 44-64, column 5, lines 15-33).

As to claim 20, Sun et al disclose an optically clocked optoelectronic track and hold apparatus (20) comprising means (a first node) for receiving an analog input signal and an optical input clocking signal (from fibers 22-25), means (diode bridge, 30) for determining whether an optical pulse (from optical fibers, 22-25) is received by two photodetectors (S1-S4) from optical input clocking signal (from fibers, 22-25), means (S1-S4) for maintaining a diode bridge (30) in forward bias if optical pulse (from optical fibers 22-25) is not received from optical input clocking signal (from optical fibers 22-25), and means (S1-S4) for switching diode bridge (30) to reverse bias for a desired time if optical pulse (from optical fibers 22-25) is received from optical input clocking signal (from optical fibers 22-25), (fig. 2, column 4, lines 6-15, column 5, lines 15-33).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5, 7-10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al in view of Metz (4,659,945).

As to claim 1, Sun et al discloses an optically clocked optoelectronic track and hold apparatus (20) comprising a diode bridge (30) comprising a first node, a second node, a third node, a fourth node, and a plurality of diodes (D1-D8) wherein plurality of diodes (D1-D8) comprises a first diode (D1) having a cathode operatively coupled to first node and an anode operatively coupled to second node, a second diode (D5) having a cathode operatively coupled to third node and an anode operatively coupled to the first node, a third diode (D3) having a cathode operatively coupled to fourth node and an anode operatively coupled to the second node, a fourth diode (D4) having a cathode operatively coupled to the third node and an anode operatively coupled to the fourth node; an input node operatively coupled to the first node of the diode bridge (30) capable of receiving an analog input signal (V_i); a first photodetector (S1-S4) having a cathode operatively coupled to the second node and an anode operatively coupled to a negative potential node ($-V$) and a second photodetector (S1-S4) having an anode operatively coupled to the third node and a cathode operatively coupled to a positive potential ($+V$) and wherein first and second photodetectors (S1-S4) are capable of receiving an optical input clocking signal (from laser 21 via optical fibers 22-25), and capable of reverse biasing and forward biasing; a hold capacitor (Ch, 40) operatively coupled to the fourth node capable of tracking the analog input signal (V_i) when the diode bridge (30) is forward biased and capable of holding analog input signal (V_i) when diode bridge (30) switches from forward biased to reverse biased, (fig. 2, column 4,

lines 6-30, column 5, lines 15-30). Sun et al also disclose that the bridge-type optoelectronic sample and hold circuit (20) easily combines the current source and switch in a single OE device, (column 9, lines 4-6). Sun et al fail to explicitly disclose a first current source operatively coupled to second node and a second current source operatively coupled to the third node of the diode bridge. Sun et al and Metz are related sample and hold circuits with a diode bridge capable of forward and reverse bias conditions. Metz discloses current sources (14, 16) transmitting currents (IS1, IS2), (fig. 4, column 3, lines 51-68, column 4, lines 1-8). It would have been obvious for one of ordinary skill in the art to modify Sun et al to include current sources as disclosed by Metz in order to generate high speed current signals to the diode bridge to allow forward biasing of the system allowing the system to perform at an optimal level.

As to claim 3, the modified Sun et al discloses two photodetectors (S1-S4) are reversed biased by voltage sources (+V, -V), (fig. 2, column 8, lines 15-20, lines 35-49).

As to claim 5, the modified Sun et al discloses a first optical input clocking signal (from laser 21 via optical fibers 22-25) and a second optical input clocking signal (from laser 21 via optical fibers 22-25) wherein first photodetector (S1-S4) is capable of receiving first optical input clocking signal (from laser 21 via optical fibers 22-25) and wherein second photodetector (S1-S4) is capable of receiving second optical input clocking signal (from laser 21 via optical fibers 22-25) and wherein first optical input clocking signal (from laser 21 via optical fibers 22-25) and second optical input clocking signal (from laser 21 via optical fibers 22-25) are synchronized, (fig. 2, column 4, lines 6-17, lines 44-55, column 5, lines 30-33).

As to claim 7, the modified Sun et al disclose first and second photodetectors (S3, S4) switches diode bridge (30) from reverse biased to forward biased when optical input clocking signal illuminates first and second photodetectors (S3, S4) with an optical pulse, (fig. 2, column 4, lines 6-18, column 5, lines 15-33).

As to claim 8, the modified Sun et al disclose first and second photodetectors (S3, S4) switches diode bridge (30) from reverse biased to forward biased when first and second photodetectors (S3, S4) do not generate enough photocurrent to reverse bias diode bridge (30), (fig. 2, column 5, lines 15-33).

As to claim 9, the modified Sun et al disclose optically clocked optoelectronic track and hold apparatus (20) is configured into a positive node device (+V) and a negative node device (-V) wherein optically clocked optoelectronic track and hold apparatus (20) receives analog input signal (V_i) and an inverted analog input signal and outputs a differential output signal (V_{out}), (fig. 2, column 4, lines 6-15, column 8, lines 15-49).

As to claim 10, the modified Sun et al disclose an amplifier (35) operatively coupled to hold capacitor (Ch, 40) capable of outputting a first track and hold output signal (V_{out}), (fig. 2, column 4, lines 26-32).

As to claim 12, the modified Sun et al disclose an electronic track and hold device (20) operatively coupled to amplifier (35) capable of receiving first track and hold output signal (V_{out}) and an electronic clock signal (from laser 21 via optical fibers 22-25), (fig. 2, column 4, lines 6-32). The modified Sun et al further disclose that Metz (fig.

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7, column 7, lines 4-11) sets forth a sampling bridge with a first electronic track and hold device (12) being connected to a second electronic track and hold device (20) via output signal (V_o) wherein the electronic track and hold device (20) is capable of outputting a second track and hold output signal (V_{out}). It would have been obvious for one of ordinary skill in the art to further modify the modified Sun et al to include the second electronic track and hold device taught by Metz in order to provide a desired compensation to the output signal from the previous circuitry of the apparatus allowing high speed signal processing and transmission throughout the system.

Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al in view of Metz and further in view of MacDonald (4,727,349).

As to claim 6, the modified Sun et al further disclose that Metz (fig. 4, column 4, lines 17-28) sets forth clamped diodes (D_1 , D_2) in a forward bias condition constitutes the rise and fall of sample voltage (V_i). The modified Sun et al in view of Metz fail to explicitly teach first and second photodetectors have fast rise times and long fall times. MacDonald et al disclose a detector shows a fast rise time and long fall times, (column 1, lines 35-53). It would have been obvious for one of ordinary skill in the art to modify Sun et al in view of Metz by utilizing photodetectors having fast rise times and long fall times as taught by MacDonald et al in order to provide desired performance of the photodetectors allowing high speed signal switching for further processing and transmission of the device.

Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al in view of Metz and further in view of Taddiken (5,455,584).

As to claim 11, Sun et al in view of Metz fail to teach a quantizer capable of quantizing first track and hold output signal and outputting a digital output signal. Taddiken disclose high frequency high resolution quantizer having a quantizer (20) operatively coupled to an amplifier (16), capable of quantizing a track and hold output signal and outputting a digital output signal. It would have been obvious for one of ordinary skill in the art to further modify Sun et al in view of Metz to include a quantizer as taught by Taddiken in order to provide a desired formation of the output signal allowing high speed processing and signal transmission throughout the device.

Allowable Subject Matter

Claims 13-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

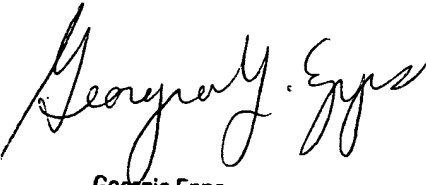
The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to disclose an optically clocked optoelectronic track and hold apparatus either singly or in combination having first and second photodetectors comprising a short transit time photodiode and a long transit time photodiode in a parallel configuration.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Don Williams whose telephone number is 571-272-8538. The examiner can normally be reached on 8:30a.m. to 5:30a.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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